

Discussion of the Invention

In automatic transmissions, it is desirable to improve clutch performance in order to reduce fuel consumption. Unfortunately, transmission oil has a very high viscosity at low temperatures, and this high viscosity will negatively affect clutch performance in the automatic transmissions (see page 2, lines 14-21). Presently, clutch performance in conventional automatic transmissions is controlled based on engine temperature, which often significantly differs from transmission oil temperature (see page 2, lines 22-29 of the original specification). Therefore, conventional automatic transmissions will often operate with low transmission oil temperatures, thereby reducing performance and fuel efficiency due to high viscosity.

The automotive heat exchanging system of the present invention as recited in independent claim 1 addresses the above problem by allowing *control of the temperature of the oil* in the automatic transmission. In particular, the system of independent claim 1 comprises a shutter operable to open and close an air passage which allows air flow through a heat exchanger to flow toward an automatic transmission; an automatic transmission oil temperature sensor for sensing a temperature of the oil in the automatic transmission; and a controller for controlling opening and closing of the *shutter* based on the automatic transmission oil temperature signal *so as to thereby control the temperature of the oil in the automatic transmission*.

The Combination of the Temmesfeld Reference and the Suzuki Reference Does Not Teach or Suggest All of the Features Recited in Independent Claim 1

As clearly established in the Manual of Patent Examining Procedure (MPEP) Chapter 2143, in order to establish a *prima facie* case of obviousness, the combination of prior art references must teach or suggest **all** the claim limitations. In the present case, however, the combination of prior art does not teach or suggest:

“a controller for controlling opening and closing of a *shutter based on the automatic transmission oil temperature signal received from the automatic transmission oil temperature sensor so as to control the temperature of the oil in the automatic transmission*.”

The Temmesfeld reference teaches an arrangement for an air cooling system of an air cooled internal combustion engine. In particular, the Temmesfeld reference teaches a rolling curtain 4 and a support screen 5 which are controlled based on operating parameters of the *engines*. However, the Examiner acknowledged that the Temmesfeld reference does not teach an oil temperature sensor. Therefore, the Temmesfeld reference also does not disclose or suggest a controller for controlling opening and closing of a **shutter** *based on an automatic transmission oil temperature signal received from an automatic transmission oil temperature sensor so as to control the temperature of the oil in the automatic transmission.*

Nonetheless, the Examiner asserted that the Suzuki reference provides the necessary teaching to motivate one of ordinary skill in the art to modify the Temmesfeld reference so as to obtain the invention recited in independent claim 1. In particular, the Examiner noted that the Suzuki reference teaches an oil temperature sensor 23 which controls the opening and closing of a *solenoid valve 19 in a hydraulic fluid bypass passage 18* (see Figure 3). At the bottom of page 4 of the outstanding Office Action, the Examiner asserted that “Suzuki teaches the use of an oil temperature sensor to activate electro-mechanical systems in order to control the temperature of the oil in an automatic transmission.” However, the Examiner’s understanding of the Suzuki reference is incorrect. Therefore, because this misunderstanding of the Suzuki reference appears to be the basis for the Examiner’s improper rejection of the claims, a detailed discussion of the Suzuki reference will be provided below.

The Suzuki reference generally discloses a conventional automatic transmission including a low clutch and a fixed orifice located in the hydraulic fluid supply line to the low clutch. In order to avoid N-D select shock, the size of the fixed orifice is reduced. Unfortunately, as explained in column 1, lines 35-42 of the Suzuki reference, the reduced size of the fixed orifice causes the charging time of the accumulator of the low clutch (located downstream of the fixed orifice) to become excessively long, thereby causing erratic performance. In other words, the amount of time required to fill (i.e., charge) the accumulator of the low clutch becomes excessively long due to the slow flow rate of the hydraulic fluid through the small fixed orifice.

This problem is increased when the temperature of the oil decreases. As explained in column 5, lines 10-15, the viscosity of the transmission oil (hydraulic fluid) will increase as the

temperature of the transmission oil decreases. Therefore, the time necessary for the transmission oil to flow through the smaller fixed orifice 13 will further increase, thereby significantly reducing performance. To address this problem, information regarding the temperature of the transmission oil is obtained by the transmission oil temperature sensor 23, and is sent to a controller 20 (see column 5, lines 24-28). If the temperature of the transmission oil is below a predetermined temperature, the controller 20 will then open the solenoid valve 19 so as to allow the transmission oil with the higher viscosity to flow through *both* the bypass passage 18 *and* through the fixed orifice 13. As a result, the transmission oil will fill the clutch accumulator 14 in a reasonable amount of time, despite the decreased temperature of the oil and resulting increased viscosity (see column 5, lines 46-58).

In view of the explanation of the Suzuki reference provided above, it is clear that the controller 20 of the Suzuki reference *compensates for* a low temperature of the transmission oil by opening the solenoid valve 19 to increase an amount of flow area, but does not control the temperature of the oil in the automatic transmission. These differences are clearly seen in a comparison of the corresponding controller elements, as shown below.

Present Invention: A controller for controlling opening and closing of a ***shutter*** arranged in a shroud forming an air passage for allowing air to flow toward an automatic transmission, based on an automatic transmission oil temperature signal received from an automatic transmission oil temperature sensor **so as to control the temperature of the oil in said automatic transmission.**

Suzuki Reference: A controller for controlling opening and closing of a **solenoid bypass valve** arranged in a hydraulic fluid bypass line, based on an automatic transmission oil temperature signal received from an automatic transmission oil temperature sensor so as to **compensate for** the temperature of the oil in the automatic transmission (i.e., increase the flow area for the oil due to the increased viscosity).

In view of the above, it is clear that the Suzuki reference does not teach or suggest a controller arranged as recited in claim 1 so as to control a temperature of the oil in an automatic transmission. Therefore, because the Temmesfeld reference does not even suggest an oil

temperature sensor, as acknowledged by the Examiner, it is clear that the combination of these references does not teach or even suggest the controller element recited in claim 1.

On page 5 of the Office Action, however, the Examiner made a statement that appears to indicate that the Examiner has given very little, if any, patentable weight to the functional language recited in independent claim 1 which describes the arrangement of the controller. In this regard, it is well established that functional language is an additional limitation in a claim, and should be given patentable weight, at least to the extent that the functional language describes the structural arrangement of claimed components. See *Wright Med. Tech., Inc. v. Osteonics Corp.*, 122 F.3d 1440, 1443-44, 43 USPQ 2d 1837, 1840 (Fed. Cir. 1997).

In the present case, the functional language at issue is used to describe the structural relationship between the controller, the shutter, and the transmission oil temperature sensor. In particular, independent claim 1 requires a controller which is connected to a *shutter* so as to be able to open and close the shutter, and the controller must be connected to the automatic transmission oil temperature sensor so as to be able to receive the automatic transmission oil temperature signal from the automatic transmission oil temperature sensor. Furthermore, the controller must have a structure which allows it to analyze the automatic transmission oil temperature signal, and then open or close the shutter based on the automatic transmission oil temperature signal so as to control the temperature of the oil of the automatic transmission. In other words, the controller limitation recited in independent claim 1 does not describe an intended use of the controller, but instead describes a physical relationship and features which are entitled to patentable weight.

As explained above, the Temmesfeld reference and the Suzuki reference do not, either alone or in combination, disclose or suggest a controller with the physical relationship and features as set forth in claim 1. In particular, these references do not teach or suggest a controller for controlling opening and closing of a *shutter* based on an automatic transmission oil temperature signal received from an automatic transmission oil temperature sensor *so as to control temperature of the oil in the automatic transmission*. In this regard, the Temmesfeld reference teaches no particular controller, and the controller of the Suzuki reference cannot open and close a shutter, and is not capable (due to its structure or arrangement) of controlling a temperature of transmission oil. Furthermore, the Nixon reference and the Tsuchikawa reference

also do not disclose or suggest the controller of claim 1. Accordingly, it is respectfully submitted that independent claim 1 and the claims that depend therefrom are clearly patentable over the prior art of record.

In view of the above amendments and remarks, it is submitted that the present application is now in condition for allowance. However, if the Examiner should have any comments or suggestions to help speed the prosecution of this application, the Examiner is requested to contact the Applicant's undersigned representative.

Respectfully submitted,

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